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Accelerated Taylor plumes for MIF targets[1] M.R. BROWN, D.A. SCHAFFNER, H.L. PARKS, A.B. ROCK, Swarthmore College — The SSX plasma device has been converted to a 2.5 m merging plasma wind tunnel configuration. Experiments are underway to study merging and stagnation of high density, helical Taylor states[2] to employ as a potential target for magneto-inertial fusion. Eventually, SSX Taylor states will be accelerated to over 100 km/s and compressed to small volumes either by stagnation or merging. Initial un-accelerated merging studies produce peak proton densities of 5×10^{15} cm^{-3}. Densities are measured with a precision quadrature He-Ne laser interferometer. Typical merged plasma parameters are $T_i = 20$ $eV, T_e = 10$ $eV, B = 0.4$ T with lifetimes of 100 μs. Results from a single prototype acceleration coil will be presented, as well as initial simulation studies of Taylor state plasma acceleration using multiple staged, pulsed theta-pinch coils.

[1]Work supported by DOE ARPA-E ALPHA program.
[2]Gray, et al, PRL **110**, 085002 (2013).

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